



SEQUENCE LISTING

<110> DRUILHE, PIERRE
DAUBERSIES, PIERRE

<120> MALARIAL PRE-ERYTHROCYTIC STAGE POLYPEPTIDE MOLECULES

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<141> 2000-12-22

<150> US 08/973,462

<151> 1998-02-06

<150> PCT/FR96/00894

<151> 1996-06-12

<150> FR 95/07007

<151> 1995-06-13

<160> 29

<170> PatentIn version 3.3

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cca act gtt gaa gaa atc gta gct cca act gtt gaa gaa att gta gct Pro Thr Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu Ile Val Ala 660 665 670	2016
cca agt gtt gta gaa agt gtg gct cca agt gtt gaa gaa agt gta gaa Pro Ser Val Val Glu Ser Val Ala Pro Ser Val Glu Glu Ser Val Glu 675 680 685	2064
gaa aat gtt gaa gaa agt gta gct gaa aat gtt gaa gaa agt gta gct Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser Val Ala 690 695 700	2112
gaa aat gtt gaa gaa agt gta gct gaa aat gtt gaa gaa agt gta gct Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser Val Ala 705 710 715 720	2160
gaa aat gtt gaa gaa atc gta gct cca act gtt gaa gaa atc gta gct Glu Asn Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu Ile Val Ala 725 730 735	2208
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cca agt gtt gaa gaa agt gta gaa gaa aat gtt gaa gaa agt gta gct Pro Ser Val Glu Glu Ser Val Glu Glu Asn Val Glu Glu Ser Val Ala 755 760 765	2304
gaa aat gtt gaa gaa agt gta gct gaa aat gtt gaa gaa agt gta gct Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser Val Ala 770 775 780	2352
gaa aat gtt gaa gaa agt gta gct cca act gtt gaa gaa att gta gct Glu Asn Val Glu Glu Ser Val Ala Pro Thr Val Glu Glu Ile Val Ala 785 790 795 800	2400
cca agt gtt gaa gaa agt gta gct cca agt gtt gaa gaa agt gtt gct Pro Ser Val Glu Glu Ser Val Ala Pro Ser Val Glu Glu Ser Val Ala 805 810 815	2448
gaa aac gtt gca aca aat tta tca gac aat ctt tta agt aat tta tta Glu Asn Val Ala Thr Asn Leu Ser Asp Asn Leu Leu Ser Asn Leu Leu 820 825 830	2496
ggg ggt atc gaa act gag gaa ata aag gac agt ata tta aat gag ata Gly Gly Ile Glu Thr Glu Glu Ile Lys Asp Ser Ile Leu Asn Glu Ile	2544

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Ile	Gln	Glu	Asn	Thr	Ile	Thr	Asn	Asp	Thr	Ile	Glu	Glu	Lys	Leu	Glu			
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Thr	Val	Phe	Asn	Thr	Val	Leu	Asp	Lys	Val	Glu	Glu	Thr	Val	Glu	Ile			
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Gly	Met	Phe	Arg	Ser	Ile	Glu	Thr	Ser	Ile	Val	Ile	Gln	Ser	Glu				
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Glu Lys Val Asp Leu Asn Glu Asn Val Val Ser Ser Ile Leu Asp 1040 1045 1050	
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att tca agt act gaa ggt gtt caa gaa act gta act gaa cat gta Ile Ser Ser Thr Glu Gly Val Gln Glu Thr Val Thr Glu His Val 1070 1075 1080	3249
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Val Glu Ile Asn Asp Ile Thr Ser Lys Leu Ile Glu Glu Thr Gln	
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Glu Leu Asn Glu Val Glu Ala Asp Leu Ile Lys Asp Met Glu Lys	
1250 1255 1260	
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Leu Lys Glu Leu Glu Lys Ala Leu Ser Glu Asp Ser Lys Glu Ile	
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Ile Asp Ala Lys Asp Asp Thr Leu Glu Lys Val Ile Glu Glu Glu	
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His Asp Ile Thr Thr Thr Leu Asp Glu Val Val Glu Leu Lys Asp	
1295 1300 1305	
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Val Glu Glu Asp Lys Ile Glu Lys Val Ser Asp Leu Lys Asp Leu	
1310 1315 1320	
gaa gaa gat ata tta aaa gaa gta aaa gaa atc aaa gaa ctt gaa	4014
Glu Glu Asp Ile Leu Lys Glu Val Lys Glu Ile Lys Glu Leu Glu	
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Ser Glu Ile Leu Glu Asp Tyr Lys Glu Leu Lys Thr Ile Glu Thr	
1340 1345 1350	
gat att tta gaa gag aaa aaa gaa ata gaa aaa gat cat ttt gaa	4104
Asp Ile Leu Glu Glu Lys Lys Glu Ile Glu Lys Asp His Phe Glu	
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aaa ttc gaa gaa gaa gct gaa gaa ata aaa gat ctt gaa gca gat	4149
Lys Phe Glu Glu Glu Ala Glu Glu Ile Lys Asp Leu Glu Ala Asp	
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Ile Leu Lys Glu Val Ser Ser Leu Glu Val Glu Glu Glu Lys Lys	
1385 1390 1395	
tta gaa gaa gta cac gaa tta aaa gaa gag gta gaa cat ata ata	4239
Leu Glu Glu Val His Glu Leu Lys Glu Glu Val Glu His Ile Ile	
1400 1405 1410	
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Ser Gly Asp Ala His Ile Lys Gly Leu Glu Glu Asp Asp Leu Glu	
1415 1420 1425	

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gat atg gaa tta ggg gat atg gat aag gaa agt tta gaa gat gta Asp Met Glu Leu Gly Asp Met Asp Lys Glu Ser Leu Glu Asp Val 1445 1450 1455	4374
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1610	1615	1620	
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ggt act aat gtt tta aaa caa Val Thr Asn Val Leu Lys Gln 1640	aat caa gat ttt ttt Asn Gln Asp Phe Phe 1645	agt aaa gtt Ser Lys Val 1650	4959
aaa aac ttc gta aaa aaa tat Lys Asn Phe Val Lys Lys Tyr 1655	aaa gta ttt gct gca Lys Val Phe Ala Ala 1660	cca ttc ata Pro Phe Ile 1665	5004
tct gcc gtt gca gca ttt gca Ser Ala Val Ala Ala Phe Ala 1670	tca tat gta gtt ggg Ser Tyr Val Val Gly 1675	ttc ttt aca Phe Phe Thr 1680	5049
ttt tct tta ttt tca tca tgt Phe Ser Leu Phe Ser Ser Cys 1685	gta aca ata gct tct Val Thr Ile Ala Ser 1690	tca act tac Ser Thr Tyr 1695	5094
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ccg ttt tat tca ttt gta ttt Pro Phe Tyr Ser Phe Val Phe 1715	gat atc ttt aag aat Asp Ile Phe Lys Asn 1720	tta aaa cat Leu Lys His 1725	5184
tat tta caa caa atg aaa gaa Tyr Leu Gln Gln Met Lys Glu 1730	aaa ttt agt aaa gaa Lys Phe Ser Lys Glu 1735	aaa aat aat Lys Asn Asn 1740	5229
aat gta ata gaa gta aca aac Asn Val Ile Glu Val Thr Asn 1745	aaa gct gag aaa aaa Lys Ala Glu Lys Lys 1750	ggg aat gta Gly Asn Val 1755	5274
cag gta aca aat aaa acc gag Gln Val Thr Asn Lys Thr Glu 1760	aaa aca act aaa gtt Lys Thr Thr Lys Val 1765	gat aaa aat Asp Lys Asn 1770	5319
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 <213> P. falciparum

<400> 3

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Asn	Asn	Glu	Gln	Ile	Thr	Thr	Ile	Phe	Asn	Arg	Thr	Asn	Met	Asn	Pro	
		20						25					30			
Ile	Lys	Lys	Cys	His	Met	Arg	Glu	Lys	Ile	Asn	Lys	Tyr	Phe	Phe	Leu	
		35					40					45				
Ile	Lys	Ile	Leu	Thr	Cys	Thr	Ile	Leu	Ile	Trp	Ala	Val	Gln	Tyr	Asp	
	50					55					60					
Asn	Asn	Ser	Asp	Ile	Asn	Lys	Ser	Trp	Lys	Lys	Asn	Thr	Tyr	Val	Asp	
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Lys	Lys	Leu	Asn	Lys	Leu	Phe	Asn	Arg	Ser	Leu	Gly	Glu	Ser	Gln	Val	
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Leu	Glu	Glu	Gly	Asn	Thr	Leu	Thr	Glu	Ser	Val	Asp	Asp	Asn	Lys	Asn	
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Leu	Glu	Glu	Ala	Glu	Asp	Ile	Lys	Glu	Asn	Ile	Leu	Leu	Ser	Asn	Ile	
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Glu	Glu	Pro	Lys	Glu	Asn	Ile	Ile	Asp	Asn	Leu	Leu	Asn	Asn	Ile	Gly	
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Asp	Glu	Leu	Phe	Asn	Glu	Leu	Leu	Asn	Ser	Val	Asp	Val	Asn	Gly	Glu	
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Val Lys Glu Asn Ile Leu Glu Glu Ser Gln Val Asn Asp Asp Ile Phe
195 200 205

Asn Ser Leu Val Lys Ser Val Gln Gln Glu Gln Gln His Asn Val Glu
210 215 220

Glu Lys Val Glu Glu Ser Val Glu Glu Asn Asp Glu Glu Ser Val Glu
225 230 235 240

Glu Asn Val Glu Glu Asn Val Glu Glu Asn Asp Asp Gly Ser Val Ala
245 250 255

Ser Ser Val Glu Glu Ser Ile Ala Ser Ser Val Asp Glu Ser Ile Asp
260 265 270

Ser Ser Ile Glu Glu Asn Val Ala Pro Thr Val Glu Glu Ile Val Ala
275 280 285

Pro Ser Val Val Glu Ser Val Ala Pro Ser Val Glu Glu Ser Val Glu
290 295 300

Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser Val Ala
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Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser Val Ala
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Glu Asn Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu Ile Val Ala
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Pro Thr Val Glu Glu Ile Val Ala Pro Ser Val Val Glu Ser Val Ala
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Pro Ser Val Glu Glu Ser Val Glu Glu Asn Val Glu Glu Ser Val Ala
370 375 380

Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser Val Ala
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Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser Val Ala
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Glu Asn Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu Ile Val Ala
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 515 520 525

Pro Thr Val Glu Glu Ile Val Ala Pro Ser Val Val Glu Ser Val Ala
 530 535 540

Pro Ser Val Glu Glu Ser Val Glu Glu Asn Val Glu Glu Ser Val Ala
 545 550 555 560

Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser Val Ala
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Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ile Val Ala
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Pro Thr Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu Ile Val Ala
 595 600 605

Pro Ser Val Val Glu Ser Val Ala Pro Ser Val Glu Glu Ser Val Glu
610 615 620

Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser Val Ala
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Pro Thr Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu Ile Val Ala
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Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser Val Ala
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Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser Val Ala
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Glu Asn Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu Ile Val Ala
725 730 735

Pro Thr Val Glu Glu Ile Val Ala Pro Ser Val Val Glu Ser Val Ala
740 745 750

Pro Ser Val Glu Glu Ser Val Glu Glu Asn Val Glu Glu Ser Val Ala
755 760 765

Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser Val Ala
770 775 780

Glu Asn Val Glu Glu Ser Val Ala Pro Thr Val Glu Glu Ile Val Ala
785 790 795 800

Pro Ser Val Glu Glu Ser Val Ala Pro Ser Val Glu Glu Ser Val Ala

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Glu	Asn	Val	Ala	Thr	Asn	Leu	Ser	Asp	Asn	Leu	Leu	Ser	Asn	Leu	Leu
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	930					935					940				
Ser	Ala	Asn	Thr	Ile	Thr	Glu	Ile	Phe	Glu	Asn	Leu	Glu	Glu	Asn	Ala
945					950					955					960
Val	Glu	Ser	Asn	Glu	Asn	Val	Ala	Glu	Asn	Leu	Glu	Lys	Leu	Asn	Glu
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Thr	Val	Phe	Asn	Thr	Val	Leu	Asp	Lys	Val	Glu	Glu	Thr	Val	Glu	Ile
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Asp	Val	Leu	Glu	Glu	Glu	Lys	Glu	Asp	Leu	Thr	Asp	Lys	Met	Ile
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Val	Glu	Glu	Val	Gln	Asp	Asn	Asp	Met	Asp	Glu	Ser	Val	Glu	Lys
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Val	Glu	Ile	Asn	Asp	Ile	Thr	Ser	Lys	Leu	Ile	Glu	Glu	Thr	Gln
1235						1240					1245			
Glu	Leu	Asn	Glu	Val	Glu	Ala	Asp	Leu	Ile	Lys	Asp	Met	Glu	Lys
1250						1255					1260			
Leu	Lys	Glu	Leu	Glu	Lys	Ala	Leu	Ser	Glu	Asp	Ser	Lys	Glu	Ile
1265						1270					1275			
Ile	Asp	Ala	Lys	Asp	Asp	Thr	Leu	Glu	Lys	Val	Ile	Glu	Glu	Glu
1280						1285					1290			
His	Asp	Ile	Thr	Thr	Thr	Leu	Asp	Glu	Val	Val	Glu	Leu	Lys	Asp
1295						1300					1305			
Val	Glu	Glu	Asp	Lys	Ile	Glu	Lys	Val	Ser	Asp	Leu	Lys	Asp	Leu
1310						1315					1320			
Glu	Glu	Asp	Ile	Leu	Lys	Glu	Val	Lys	Glu	Ile	Lys	Glu	Leu	Glu
1325						1330					1335			
Ser	Glu	Ile	Leu	Glu	Asp	Tyr	Lys	Glu	Leu	Lys	Thr	Ile	Glu	Thr
1340						1345					1350			
Asp	Ile	Leu	Glu	Glu	Lys	Lys	Glu	Ile	Glu	Lys	Asp	His	Phe	Glu
1355						1360					1365			
Lys	Phe	Glu	Glu	Glu	Ala	Glu	Glu	Ile	Lys	Asp	Leu	Glu	Ala	Asp
1370						1375					1380			
Ile	Leu	Lys	Glu	Val	Ser	Ser	Leu	Glu	Val	Glu	Glu	Glu	Lys	Lys
1385						1390					1395			

Leu	Glu	Glu	Val	His	Glu	Leu	Lys	Glu	Glu	Val	Glu	His	Ile	Ile
1400						1405					1410			
Ser	Gly	Asp	Ala	His	Ile	Lys	Gly	Leu	Glu	Glu	Asp	Asp	Leu	Glu
1415						1420					1425			
Glu	Val	Asp	Asp	Leu	Lys	Gly	Ser	Ile	Leu	Asp	Met	Leu	Lys	Gly
1430						1435					1440			
Asp	Met	Glu	Leu	Gly	Asp	Met	Asp	Lys	Glu	Ser	Leu	Glu	Asp	Val
1445						1450					1455			
Thr	Thr	Lys	Leu	Gly	Glu	Arg	Val	Glu	Ser	Leu	Lys	Asp	Val	Leu
1460						1465					1470			
Ser	Ser	Ala	Leu	Gly	Met	Asp	Glu	Glu	Gln	Met	Lys	Thr	Arg	Lys
1475						1480					1485			
Lys	Ala	Gln	Arg	Pro	Lys	Leu	Glu	Glu	Val	Leu	Leu	Lys	Glu	Glu
1490						1495					1500			
Val	Lys	Glu	Glu	Pro	Lys	Lys	Lys	Ile	Thr	Lys	Lys	Lys	Val	Arg
1505						1510					1515			
Phe	Asp	Ile	Lys	Asp	Lys	Glu	Pro	Lys	Asp	Glu	Ile	Val	Glu	Val
1520						1525					1530			
Glu	Met	Lys	Asp	Glu	Asp	Ile	Glu	Glu	Asp	Val	Glu	Glu	Asp	Ile
1535						1540					1545			
Glu	Glu	Asp	Ile	Glu	Glu	Asp	Lys	Val	Glu	Asp	Ile	Asp	Glu	Asp
1550						1555					1560			
Ile	Asp	Glu	Asp	Ile	Gly	Glu	Asp	Lys	Asp	Glu	Val	Ile	Asp	Leu
1565						1570					1575			
Ile	Val	Gln	Lys	Glu	Lys	Arg	Ile	Glu	Lys	Val	Lys	Ala	Lys	Lys

1580		1585		1590
Lys Lys Leu Glu Lys Lys Val Glu Glu Gly Val Ser Gly Leu Lys	1595	1600		1605
Lys His Val Asp Glu Val Met Lys Tyr Val Gln Lys Ile Asp Lys	1610	1615		1620
Glu Val Asp Lys Glu Val Ser Lys Ala Leu Glu Ser Lys Asn Asp	1625	1630		1635
Val Thr Asn Val Leu Lys Gln Asn Gln Asp Phe Phe Ser Lys Val	1640	1645		1650
Lys Asn Phe Val Lys Lys Tyr Lys Val Phe Ala Ala Pro Phe Ile	1655	1660		1665
Ser Ala Val Ala Ala Phe Ala Ser Tyr Val Val Gly Phe Phe Thr	1670	1675		1680
Phe Ser Leu Phe Ser Ser Cys Val Thr Ile Ala Ser Ser Thr Tyr	1685	1690		1695
Leu Leu Ser Lys Val Asp Lys Thr Ile Asn Lys Asn Lys Glu Arg	1700	1705		1710
Pro Phe Tyr Ser Phe Val Phe Asp Ile Phe Lys Asn Leu Lys His	1715	1720		1725
Tyr Leu Gln Gln Met Lys Glu Lys Phe Ser Lys Glu Lys Asn Asn	1730	1735		1740
Asn Val Ile Glu Val Thr Asn Lys Ala Glu Lys Lys Gly Asn Val	1745	1750		1755
Gln Val Thr Asn Lys Thr Glu Lys Thr Thr Lys Val Asp Lys Asn	1760	1765		1770

Asn Lys Val Pro Lys Lys Arg Arg Thr Gln Lys Ser Lys
 1775 1780 1785

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<220>
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 gat ata aag gaa aat atc tta tta agt aat ata gaa gaa cca aaa gaa 97
 Asp Ile Lys Glu Asn Ile Leu Leu Ser Asn Ile Glu Glu Pro Lys Glu
 20 25 30
 aat att att gac aat tta tta aat aat att gga caa aat tca gaa aaa 145
 Asn Ile Ile Asp Asn Leu Leu Asn Asn Ile Gly Gln Asn Ser Glu Lys
 35 40 45
 caa gaa agt gta tca gaa aat gta caa gtc agt gat gaa ctt ttt aat 193
 Gln Glu Ser Val Ser Glu Asn Val Gln Val Ser Asp Glu Leu Phe Asn
 50 55 60
 gaa tta tta aat agt gta gat gtt aat gga gaa gta aaa gaa aat att 241
 Glu Leu Leu Asn Ser Val Asp Val Asn Gly Glu Val Lys Glu Asn Ile
 65 70 75 80
 ttg gag gaa agt caa gtt aat gac gat att ttt aat agt tta gta aaa 289
 Leu Glu Glu Ser Gln Val Asn Asp Asp Ile Phe Asn Ser Leu Val Lys
 85 90 95
 agt gtt caa caa gaa caa caa cac aat gtt gaa gaa aaa gtt gaa gaa 337
 Ser Val Gln Gln Glu Gln Gln His Asn Val Glu Glu Lys Val Glu Glu
 100 105 110
 agt gta gaa gaa aat gac gaa gaa agt gta gaa gaa aat gta gaa gaa 385
 Ser Val Glu Glu Asn Asp Glu Glu Ser Val Glu Glu Asn Val Glu Glu
 115 120 125
 aat gta gaa gaa aat gac gac gga agt gta gcc tca agt gtt gaa gaa 433
 Asn Val Glu Glu Asn Asp Asp Gly Ser Val Ala Ser Ser Val Glu Glu
 130 135 140

agt Ser 145	ata Ile	gct Ala	tca Ser	agt Ser	gtt Val 150	gat Asp	gaa Glu	agt Ser	ata Ile	gat Asp 155	tca Ser	agt Ser	att Ile	gaa Glu 160	gaa Glu	481
aat Asn	gta Val	gct Ala	cca Pro	act Thr 165	gtt Val	gaa Glu	gaa Glu	atc Ile	gta Val 170	gct Ala	cca Pro	act Thr	gtt Val 175	gaa Glu	gaa Glu	529
att Ile	gta Val	gct Ala	cca Pro 180	agt Ser	gtt Val	gta Val	gaa Glu	agt Ser 185	gtg Val	gct Ala	cca Pro	agt Ser	gtt Val 190	gaa Glu	gaa Glu	577
agt Ser	gta Val	gct Ala 195	cca Pro	agt Ser	gtt Val	gaa Glu	gaa Glu 200	agt Ser	gta Val	gct Ala	gaa Glu	aat Asn 205	gtt Val	gaa Glu	gaa Glu	625
agt Ser 210	gta Val	gct Ala	gaa Glu	aat Asn	gtt Val	gaa Glu 215	gaa Glu	atc Ile	gta Val	gct Ala	cca Pro 220	agt Ser	gtt Val	gaa Glu	gaa Glu	673
agt Ser 225	gta Val	gct Ala	gaa Glu	aat Asn	gtt Val 230	gaa Glu	gaa Glu	agt Ser	gta Val	gct Ala 235	gaa Glu	aat Asn	gtt Val	gaa Glu 240	gaa Glu	721
agt Ser	gta Val	gct Ala	gaa Glu	aat Asn 245	gtt Val	gaa Glu	gaa Glu	agt Ser	gta Val 250	gct Ala	gaa Glu	aat Asn	gtt Val 255	gaa Glu	gaa Glu	769
agt Ser	gta Val	gct Ala	gaa Glu 260	aat Asn	gtt Val	gaa Glu	gaa Glu	atc Ile 265	gta Val	gct Ala	cca Pro	act Thr	gtt Val 270	gaa Glu	gaa Glu	817
agt Ser	gta Val	gct Ala	cca Pro 275	act Thr	gtt Val	gaa Glu	gaa Glu 280	att Ile	gta Val	gct Ala	cca Pro	act Thr 285	gtt Val	gaa Glu	gaa Glu	865
agt Ser 290	gta Val	gct Ala	cca Pro	act Thr	gtt Val	gaa Glu	gaa Glu 295	att Ile	gta Val	gtt Val 300	cca Pro	agt Ser	gtt Val	gaa Glu	gaa Glu	913
agt Ser 305	gta Val	gct Ala	cca Pro	agt Ser	gtt Val 310	gaa Glu	gaa Glu	agt Ser	gta Val	gct Ala 315	gaa Glu	aat Asn	gtt Val 320	gaa Glu	gaa Glu	961
agt Ser	gta Val	gct Ala	gaa Glu	aat Asn 325	gtt Val	gaa Glu	gaa Glu	agt Ser	gta Val 330	gct Ala	gaa Glu	aat Asn	gtt Val 335	gaa Glu	gaa Glu	1009
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atc gta gct cca agt gtt gaa gaa atc gta gct cca act gtt gaa gaa Ile Val Ala Pro Ser Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu 355 360 365	1105
agt gtt gct gaa aac gtt gca aca aat tta tca gac aat ctt tta agt Ser Val Ala Glu Asn Val Ala Thr Asn Leu Ser Asp Asn Leu Leu Ser 370 375 380	1153
aat tta tta ggt ggt atc gaa act gag gaa ata aag gac agt ata tta Asn Leu Leu Gly Gly Ile Glu Thr Glu Glu Ile Lys Asp Ser Ile Leu 385 390 395 400	1201
aat gag ata gaa gaa gta aaa gaa aat gta gtc acc aca ata cta gaa Asn Glu Ile Glu Glu Val Lys Glu Asn Val Val Thr Thr Ile Leu Glu 405 410 415	1249
aaa gta gaa gaa act aca gct gaa agt gta act act ttt agt aat ata Lys Val Glu Glu Thr Thr Ala Glu Ser Val Thr Thr Phe Ser Asn Ile 420 425 430	1297
tta gag gag ata caa gaa aat act att act aat gat act ata gag gaa Leu Glu Glu Ile Gln Glu Asn Thr Ile Thr Asn Asp Thr Ile Glu Glu 435 440 445	1345
aaa tta gaa gaa ctc cac gaa aat gta tta agt gcc gct tta gaa aat Lys Leu Glu Glu Leu His Glu Asn Val Leu Ser Ala Ala Leu Glu Asn 450 455 460	1393
acc caa agt gaa gag gaa aag aaa gaa gta ata gat gta att gaa gaa Thr Gln Ser Glu Glu Glu Lys Lys Glu Val Ile Asp Val Ile Glu Glu 465 470 475 480	1441
gta aaa gaa gag gtc gct acc act tta ata gaa act gtg gaa cag gca Val Lys Glu Glu Val Ala Thr Thr Leu Ile Glu Thr Val Glu Gln Ala 485 490 495	1489
gaa gaa gag agc gaa agt aca att acg gaa ata ttt gaa aat tta gaa Glu Glu Glu Ser Glu Ser Thr Ile Thr Glu Ile Phe Glu Asn Leu Glu 500 505 510	1537
gaa aat gca gta gaa agt aat gaa aaa gtt gca gag aat tta gag aaa Glu Asn Ala Val Glu Ser Asn Glu Lys Val Ala Glu Asn Leu Glu Lys 515 520 525	1585
tta aac gaa act gta ttt aat act gta tta gat aaa gta gag gaa aca Leu Asn Glu Thr Val Phe Asn Thr Val Leu Asp Lys Val Glu Glu Thr 530 535 540	1633
gta gaa att agc gga gaa agt tta gaa aac aat gaa atg gat aaa gca Val Glu Ile Ser Gly Glu Ser Leu Glu Asn Asn Glu Met Asp Lys Ala	1681

545		550		555		560	
ttt ttt agt gaa ata ttt gat aat gta aaa gga ata caa gaa aat tta							1729
Phe Phe Ser Glu Ile Phe Asp Asn Val Lys Gly Ile Gln Glu Asn Leu							
	565			570		575	
tta aca ggt atg ttt cga agt ata gaa acc agt ata gta atc caa tca							1777
Leu Thr Gly Met Phe Arg Ser Ile Glu Thr Ser Ile Val Ile Gln Ser							
	580			585		590	
gaa gaa aag gtt gat ttg aat gaa aat gtg gtt agt tcg att tta gat							1825
Glu Glu Lys Val Asp Leu Asn Glu Asn Val Val Ser Ser Ile Leu Asp							
	595			600		605	
aat ata gaa aat atg aaa gaa ggt tta tta aat aaa tta gaa aat att							1873
Asn Ile Glu Asn Met Lys Glu Gly Leu Leu Asn Lys Leu Glu Asn Ile							
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tca agt act gaa ggc gaa							1891
Ser Ser Thr Glu Gly Glu							
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			20					25						30		
Asn Ile Ile Asp Asn Leu Leu Asn Asn Ile Gly Gln Asn Ser Glu Lys																
			35					40					45			
Gln Glu Ser Val Ser Glu Asn Val Gln Val Ser Asp Glu Leu Phe Asn																
	50					55					60					
Glu Leu Leu Asn Ser Val Asp Val Asn Gly Glu Val Lys Glu Asn Ile																
	65					70				75						80
Leu Glu Glu Ser Gln Val Asn Asp Asp Ile Phe Asn Ser Leu Val Lys																

85

90

95

Ser Val Gln Gln Glu Gln Gln His Asn Val Glu Glu Lys Val Glu Glu
 100 105 110

Ser Val Glu Glu Asn Asp Glu Glu Ser Val Glu Glu Asn Val Glu Glu
 115 120 125

Asn Val Glu Glu Asn Asp Asp Gly Ser Val Ala Ser Ser Val Glu Glu
 130 135 140

Ser Ile Ala Ser Ser Val Asp Glu Ser Ile Asp Ser Ser Ile Glu Glu
 145 150 155 160

Asn Val Ala Pro Thr Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu
 165 170 175

Ile Val Ala Pro Ser Val Val Glu Ser Val Ala Pro Ser Val Glu Glu
 180 185 190

Ser Val Ala Pro Ser Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu
 195 200 205

Ser Val Ala Glu Asn Val Glu Glu Ile Val Ala Pro Ser Val Glu Glu
 210 215 220

Ser Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu
 225 230 235 240

Ser Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu
 245 250 255

Ser Val Ala Glu Asn Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu
 260 265 270

Ser Val Ala Pro Thr Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu
 275 280 285

Ser Val Ala Pro Thr Val Glu Glu Ile Val Val Pro Ser Val Glu Glu
290 295 300

Ser Val Ala Pro Ser Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu
305 310 315 320

Ser Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu
325 330 335

Ser Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu
340 345 350

Ile Val Ala Pro Ser Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu
355 360 365

Ser Val Ala Glu Asn Val Ala Thr Asn Leu Ser Asp Asn Leu Leu Ser
370 375 380

Asn Leu Leu Gly Gly Ile Glu Thr Glu Glu Ile Lys Asp Ser Ile Leu
385 390 395 400

Asn Glu Ile Glu Glu Val Lys Glu Asn Val Val Thr Thr Ile Leu Glu
405 410 415

Lys Val Glu Glu Thr Thr Ala Glu Ser Val Thr Thr Phe Ser Asn Ile
420 425 430

Leu Glu Glu Ile Gln Glu Asn Thr Ile Thr Asn Asp Thr Ile Glu Glu
435 440 445

Lys Leu Glu Glu Leu His Glu Asn Val Leu Ser Ala Ala Leu Glu Asn
450 455 460

Thr Gln Ser Glu Glu Glu Lys Lys Glu Val Ile Asp Val Ile Glu Glu
465 470 475 480

Val Lys Glu Glu Val Ala Thr Thr Leu Ile Glu Thr Val Glu Gln Ala
485 490 495

Glu Glu Glu Ser Glu Ser Thr Ile Thr Glu Ile Phe Glu Asn Leu Glu
500 505 510

Glu Asn Ala Val Glu Ser Asn Glu Lys Val Ala Glu Asn Leu Glu Lys
515 520 525

Leu Asn Glu Thr Val Phe Asn Thr Val Leu Asp Lys Val Glu Glu Thr
530 535 540

Val Glu Ile Ser Gly Glu Ser Leu Glu Asn Asn Glu Met Asp Lys Ala
545 550 555 560

Phe Phe Ser Glu Ile Phe Asp Asn Val Lys Gly Ile Gln Glu Asn Leu
565 570 575

Leu Thr Gly Met Phe Arg Ser Ile Glu Thr Ser Ile Val Ile Gln Ser
580 585 590

Glu Glu Lys Val Asp Leu Asn Glu Asn Val Val Ser Ser Ile Leu Asp
595 600 605

Asn Ile Glu Asn Met Lys Glu Gly Leu Leu Asn Lys Leu Glu Asn Ile
610 615 620

Ser Ser Thr Glu Gly Glu
625 630

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<211> 28
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<213> Artificial Sequence

<220>
<223> Synthetic DNA

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28

<210> 7
<211> 29

<212> DNA
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 <223> Synthetic DNA

 <400> 7
 tgttgttctt gttgaacact ttttactaa

29

<210> 8
 <211> 25
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Synthetic DNA

 <400> 8
 ggtatcgaaa ctgaggaaat aaagg

25

<210> 9
 <211> 24
 <212> DNA
 <213> Artificial Sequence

 <220>
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 <400> 9
 catagcagga acatcaacat ccac

24

<210> 10
 <211> 50
 <212> PRT
 <213> Artificial Sequence

 <220>
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 <400> 10

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Glu	Val	Lys	Glu	Asn	Ile	Leu	Glu	Glu	Ser	Gln	Val	Asn	Asp	Asp	Ile
			20					25					30		

Phe Asn Ser Leu Val Lys Ser Val Gln Gln Glu Gln Gln His Asn Val
 35 40 45

Glu Glu
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<210> 11
 <211> 100
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic Peptide

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Val Glu Glu Ser Val Glu Glu Asn Asp Glu Glu Ser Val Glu Glu Asn
 1 5 10 15

Val Glu Glu Asn Val Glu Asn Asn Asp Asp Gly Ser Val Ala Ser Ser
 20 25 30

Val Glu Glu Ser Ile Ala Ser Ser Val Asp Glu Ser Ile Asp Ser Ser
 35 40 45

Ile Glu Glu Asn Val Ala Pro Thr Val Glu Glu Ile Val Ala Pro Thr
 50 55 60

Val Glu Glu Ile Val Ala Pro Ser Val Val Glu Lys Cys Ala Pro Ser
 65 70 75 80

Val Glu Glu Ser Val Ala Pro Ser Val Glu Glu Ser Val Ala Glu Met
 85 90 95

Leu Lys Glu Arg
 100

<210> 12
 <211> 47
 <212> PRT
 <213> Artificial Sequence

<220>

<223> Synthetic Peptide

<400> 12

Arg Asp Glu Leu Phe Asn Glu Leu Leu Asn Ser Val Asp Val Asn Gly
1 5 10 15

Glu Val Lys Glu Asn Ile Leu Glu Glu Ser Gln Val Asn Asp Asp Ile
20 25 30

Phe Asn Ser Leu Val Lys Ser Val Gln Gln Glu Gln Gln His Asn
35 40 45

<210> 13

<211> 26

<212> PRT

<213> Artificial Sequence

<220>

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<400> 13

Asp Glu Leu Phe Asn Glu Leu Leu Asn Ser Val Asp Val Asn Gly Glu
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Val Lys Glu Asn Ile Leu Glu Glu Ser Gln
20 25

<210> 14

<211> 27

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic Peptide

<400> 14

Leu Glu Glu Ser Gln Val Asn Asp Asp Ile Phe Ser Asn Ser Leu Val
1 5 10 15

Lys Ser Val Gln Gln Glu Gln Gln His Asn Val

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25

<210> 15
<211> 28
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Peptide

<400> 15

Val Glu Ser Val Ala Pro Ser Val Glu Glu Ser Val Ala Pro Ser Val
1 5 10 15

Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser Val
20 25

<210> 16
<211> 20
<212> PRT
<213> Artificial Sequence

<220>
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<400> 16

Leu Leu Ser Asn Ile Glu Glu Pro Lys Glu Asn Ile Ile Asp Asn Leu
1 5 10 15

Leu Asn Asn Ile
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<210> 17
<211> 4
<212> PRT
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<220>
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<400> 17

Val Glu Glu Ser
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<210> 18
<211> 4
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<220>
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<400> 18

Val Glu Glu Asn
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<210> 19
<211> 4
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<400> 19

Val Glu Glu Ile
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<210> 20
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
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<400> 20

Val Ala Pro Ser
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<210> 21
<211> 56
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Peptide

<400> 21

Val Glu Glu Lys Val Glu Glu Ser Val Glu Glu Asn Asp Glu Glu Ser
1 5 10 15

Val Glu Glu Asn Val Glu Glu Asn Val Glu Glu Asn Asp Asp Gly Ser
20 25 30

Val Ala Ser Ser Val Glu Glu Ser Ile Ala Ser Ser Val Asp Glu Ser
35 40 45

Ile Asp Ser Ser Ile Glu Glu Asn
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<210> 22

<211> 540

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic Peptide

<400> 22

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Val Ala Pro Ser Val Glu Glu Ser Val Glu Glu Asn Val Glu Glu Ser
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Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
35 40 45

Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ile
50 55 60

Val Ala Pro Thr Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu Ile
65 70 75 80

Val Ala Pro Ser Val Val Glu Ser Val Ala Pro Ser Val Glu Glu Ser
85 90 95

Val Glu Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
100 105 110

Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
115 120 125

Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ile
130 135 140

Val Ala Pro Thr Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu Ile
145 150 155 160

Val Ala Pro Ser Val Val Glu Ser Val Ala Pro Ser Val Glu Glu Ser
165 170 175

Val Glu Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
180 185 190

Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
195 200 205

Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
210 215 220

Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ile
225 230 235 240

Val Ala Pro Thr Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu Ile
245 250 255

Val Ala Pro Ser Val Val Glu Ser Val Ala Pro Ser Val Glu Glu Ser
260 265 270

Val Glu Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
275 280 285

Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser

290

295

300

Val Ala Glu Asn Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu Ile
305 310 315 320

Val Ala Pro Thr Val Glu Glu Ile Val Ala Pro Ser Val Val Glu Ser
325 330 335

Val Ala Pro Ser Val Glu Glu Ser Val Glu Glu Asn Val Glu Glu Ser
340 345 350

Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
355 360 365

Val Ala Glu Asn Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu Ile
370 375 380

Val Ala Pro Thr Val Glu Glu Ile Val Ala Pro Ser Val Val Glu Ser
385 390 395 400

Val Ala Pro Ser Val Glu Glu Ser Val Glu Glu Asn Val Glu Glu Ser
405 410 415

Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
420 425 430

Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ile
435 440 445

Val Ala Pro Thr Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu Ile
450 455 460

Val Ala Pro Ser Val Val Glu Ser Val Ala Pro Ser Val Glu Glu Ser
465 470 475 480

Val Glu Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
485 490 495

Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
500 505 510

Val Ala Pro Thr Val Glu Glu Ile Val Ala Pro Ser Val Glu Glu Ser
515 520 525

Val Ala Pro Ser Val Glu Glu Ser Val Ala Glu Asn
530 535 540

<210> 23
<211> 39
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Peptide

<400> 23

Asp Glu Asp Ile Glu Glu Asp Val Glu Glu Asp Ile Glu Glu Asp Ile
1 5 10 15

Glu Glu Asp Lys Val Glu Asp Ile Asp Glu Asp Ile Asp Glu Asp Ile
20 25 30

Gly Glu Asp Lys Asp Glu Val
35

<210> 24
<211> 56
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Peptide

<400> 24

Val Glu Glu Lys Val Glu Glu Ser Val Glu Glu Asn Asp Glu Glu Ser
1 5 10 15

Val Glu Glu Asn Val Glu Glu Asn Val Glu Glu Asn Asp Asp Gly Ser
20 25 30

Val Ala Ser Ser Val Glu Glu Ser Ile Ala Ser Ser Val Asp Glu Ser
 35 40 45

Ile Asp Ser Ser Ile Glu Glu Asn
 50 55

<210> 25
 <211> 212
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic Peptide

<400> 25

Val Ala Pro Thr Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu Ile
 1 5 10 15

Val Ala Pro Ser Val Val Glu Ser Val Ala Pro Ser Val Glu Glu Ser
 20 25 30

Val Ala Pro Ser Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
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Val Ala Glu Asn Val Glu Glu Ile Val Ala Pro Ser Val Glu Glu Ser
 50 55 60

Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
 65 70 75 80

Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
 85 90 95

Val Ala Glu Asn Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu Ser
 100 105 110

Val Ala Pro Thr Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu Ser
 115 120 125

Val Ala Pro Thr Val Glu Glu Ile Val Val Pro Ser Val Glu Glu Ser
130 135 140

Val Ala Pro Ser Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
145 150 155 160

Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
165 170 175

Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ile
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Val Ala Pro Ser Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu Ser
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Val Ala Glu Asn
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